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tor centres in the hemisphere which had not been explicitly exercised. This necessarily brings to our consideration the manner in which we are to think of these associations as taking place. The long period of helplessness in the highest mammalia, the evident effect of training and exercise in the earliest years of life, would seem at first to point to the establishment of new morphological relations as the result of functional activity. A closer examination brings out a good deal of evidence against this view. If functional superiority has a morphological basis, then the left side of the brain should in most instances be the more largely developed. In the average individual the difference in weight between the two hemispheres lies within the errors of observation. We must consider that, if a morphological change is brought about, it is practically the same in both hemispheres. Further, in Laura Bridgman, the portions of the hemispheres connected with her defective senses, though in some instances slightly abnormal, were by no means lacking nor histologically degenerate. So far as we know she had neither visual or sensory memories. Considering growth and function as closely related, then the growth in these portions of her hemispheres was certainly remarkable. I am inclined to the view that the morphological characteristics of a brain are very early fixed and that education has to do mainly with functional developments hence, in the case we have been considering, the reacquisition of speech would depend on association paths which had already existed. The sensory regions of the cortex have a peculiar interest and value, for it seems on the one hand that the ideational of processes are most closely linked with the sensory regions and that on the other hand a single sensory region may serve as the basis for an intellectual life: witness the mental development of the blind deaf-mutes. It may be safely said that in acuteness, man is surpassed by some animal in the case of every sense. Man is peculiar in the high development of several senses and in the ability for cross-reference between them, so that, although each principal sense at least would seem to be sufficient for a basis of an intellectual existence, and thus each sensory region might be considered a little brain, yet fullness of intellectual development would appear to associate itself with a high simultaneous development. On this point the manifold symptoms of aphasia are most instructive.

NOTES ON MODELS OF THE BRAIN.

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1. The use of models of the brain as one means of instruction requires no apology. In view of the interest which at present attaches to such models, I have made a list of the principal ones with some annotations. At my suggestion, Mr. T. L. Bolton has prepared a translation of the description of the large brain-model manufactured by Auzoux. This model appears to be, on the whole, the most instructive one, and, as the original description was in French, the anatomical terms of which are, as a rule, unfamiliar to our students, it was thought that such a translation of the description would make it more generally useful.

LIST OF MODELS.

1. Aeby's wire model of brain and cord: (*Phantom des Faserverlaufes im menschlichen Gehirn und Rückenmark* von Prof. Dr. Chs. Aeby). Made by F. R. Büchi, Meckaniker, Berne, Switzerland. Price, 500 francs. Material, wire and cork. Shows the path of the fibres according to Wernicke and is enlarged about six diameters. Useful from the fact that, though giving the relations in three dimensions, it is transparent.

2. Auzoux (Mme. Ve Auzoux, 56 Rue de Vanguard, Paris). The synthetic preparation of the brain (*Cerveau de Texture de tres-grande*

dimension. Prix, 300 Fr. Enlargement about two diameters.) is the one to which the following description applies. It is a valuable preparation from the fact that it shows the inter-relations of the deep portions. Auzoux makes a number of other preparations of both brain and cord, which are less elaborate and for which the reader is referred to his catalog. Material: Papier maché.

3. Exner. In the physiological institute of the University of Vienna, there is made a plaster cast of cerebrum—life size—on which are marked the cortical centres as determined by Exner,—vide. "Localization der Functionen in der Grosshirnrinde des Menschen." Price, 10 Marks.

4. Fick. Phantom des Menschenhirns. Ludwig Fick—natural size—paper. Price, 2 M. This is an attempt to show the relations by layers of paper cut in the proper shape and colored. It is a very helpful device.

5. Tramond. Maison Vasseur, 9 Rue de l'école de médecine, Paris. Among the very numerous models made by this firm, a number relate to the central nervous system. "Anatomie du bulbe rachidien grossi par 13 coupes, d'après Mathias Duval." Price, 80 francs. (Plaster of Paris.) The transverse sections admit of identifying the appearance of a section with its level in the medulla. The preparation is rather rough, especially in the painting of the sections.

6. Ziegler. Dr. Adolph Ziegler in Freiburg. Baden, Germany. This maker works in wax, and his preparations are both accurate and artistic. The gyri of human brain — Ecker — shown in two pieces — life size. 30 Marks. The development of the gyri in the human brain—Ecker—shown in 14 pieces—life size. 54 Marks. Form of brain in the vertebrate series: 8 pieces, somewhat enlarged. Price, 136 marks. These three sets of models are very useful for the study of the development of the gyri in man and for a general idea of the comparative development of the brain in vertebrates.

The above list represents but a few of the available models, but I believe it contains those which will be found most serviceable for ordinary purposes. A model can be constructed by enlarging cross sections of a part and drawing them on large panes of glass. These panes arranged in series in a frame thus give a fair idea of the part, being at the same time transparent. We have thus constructed a model of the spinal cord in man. An accurate opaque model can be made from plates of wax of proper thickness, on which the enlarged sections of an object are outlined, and then the portion so outlined is cut out. These plates of wax, when piled together, will then represent the object enlarged so many diameters.

To the following translation I wish to preface a few words. The model described is based on the views of Dr. Luys. In some instances these can be shown to be wrong, and, in others, open to serious objections. In the main they agree with the anatomy of the day. It is not our purpose to edit the description, any further than is needful for the present case. All that appeared superfluous in the original description has been omitted in the translation. After the erroneous or doubtful designations, we have for the most part contented ourselves with putting [Luys] in brackets, to designate that the view presented by that author was not generally accepted.

We have introduced some synonyms. In the cases which are most complete, the English, Latin, Terms of Wilder, French and German are given in the order named, but we have been guided here more by what we thought would be of assistance, than by the idea of formal completeness.